

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
23 October 2003 (23.10.2003)

PCT

(10) International Publication Number
WO 03/087436 A1(51) International Patent Classification⁷: **C25D 5/48**,
17/00, 7/12, C25F 3/30, 7/00

(21) International Application Number: PCT/US03/10725

(22) International Filing Date: 8 April 2003 (08.04.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/370,929	8 April 2002 (08.04.2002)	US
60/370,956	8 April 2002 (08.04.2002)	US
60/370,955	8 April 2002 (08.04.2002)	US
60/370,919	8 April 2002 (08.04.2002)	US
60/372,542	14 April 2002 (14.04.2002)	US
60/372,567	14 April 2002 (14.04.2002)	US
60/372,566	14 April 2002 (14.04.2002)	US
60/390,460	21 June 2002 (21.06.2002)	US

(71) Applicant (for all designated States except US): **ACM RESEARCH, INC.** [US/US]; Suite 610, 46520 Fremont Boulevard, Fremont, CA 94538 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WANG, Hui** [US/US]; 340 Jacaranda Drive, Fremont, CA 94539 (US).

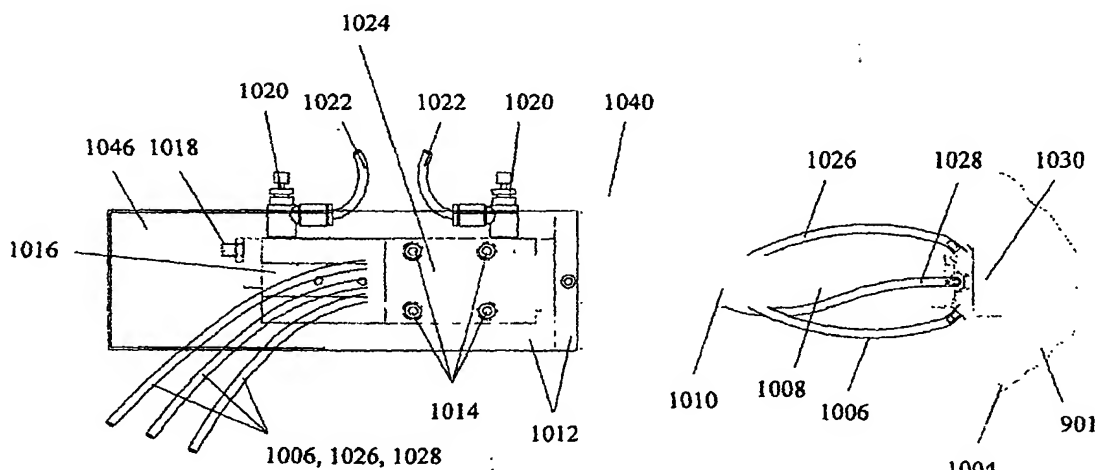
NUCH, Voha [US/US]; 2382 Balme Drive, San Jose, CA 95122 (US); **GUTMAN, Felix** [US/US]; 5237 Mill Creek Lane, San Jose, CA 95136 (US); **AFNAN, Muhammed** [US/US]; 1048 Vuelta Olives, Fremont, CA 94539 (US); **CHOKSHI, Himanshu, J.** [US/US]; 38642 Pickering Court, Fremont, CA 94536 (US); **VAN KERKWKYK, Mark, Jacobus** [US/US]; 24607 Amador Street, #20, Hayward, CA 94544 (US); **KOEHLER, Damon, L.** [US/US]; 39601 Fremont Blvd., Fremont, CA 94538 (US); **YIH, Peihaur** [—/US]; 8 Alpine Road, Boonton, NJ 07005 (US); **NGUYEN, My, Hoang** [VN/US]; 512 Toyon Avenue, # 162, San Jose, CA 95127 (US); **CHANG, Ru, Kao** [US/US]; 397 Preston Drive, Mountain View, CA 94040 (US); **HO, Frederick** [US/US]; 5999 Sorrel Avenue, San Jose, CA 95123 (US).

(74) Agents: **YIM, Peter, J.** et al.; Morrison & Foerster LLP, 425 Market Street, San Francisco, CA 94105-2482 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: ELECTROPOLISHING AND/OR ELECTROPLATING APPARATUS AND METHODS



(57) **Abstract** In one aspect of the present invention, exemplary apparatus and methods are provided for electropolishing and/or electroplating processes for semiconductor wafers. One exemplary apparatus includes a cleaning module having an edge clean assembly (930) to remove metal residue on the bevel or edge portion of a wafer (901). The edge cleaning apparatus includes a nozzle head (1030) configured to supply a liquid and a gas to a major surface of the wafer, and supplies the gas radially inward of the location the liquid is supplied to reduce the potential of the liquid from flowing radially inward to the metal film formed on the wafer.